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INTER-OFFICE CORRESPONDENCE

Richmond, Virginia

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To: R. N. Ferguson

Date: December 23, 1991

From: D. L. Faustini

Subject: Operation Support: Operational Plans for Project 1101 for 1992

OBJECTIVE

Provide entomological support, in a timely manner, to PM USA. Perform research on cigarette beetle (CB) control. Serve as the experts within the company to provide assistance in controlling the CB and other injurious pests at all locations.

STATUS

1. **Research Studies**

- a. CB control agents other than KABAT,

STATUS: Continue to investigate Nylar, (IGR) and other IGR's and tobacco hornworm purge fluid.

- b. CB physiological differences to methoprene and phosphine

STATUS: Continue to investigate biological differences between laboratory and field populations regarding methoprene and phosphine.

2. **Support Projects**

- a. Infestation Control Manuals

STATUS: Completed distribution via TTG.

- b. Customer complaint evaluation from Product Audit Facility

STATUS: Continue to monitor insect infestations of finished product as related to customer complaints and determine means of prevention.

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- c. Assist Engineering Department personnel with direct cylinder conditioning (DCC) of various tobaccos.

STATUS: Completed CB efficacy evaluation at Cabarrus.

- d. Assist PM USA and PMI as requested

STATUS: Continue to provide operating support to PM Companies as needed.

PLANS: 1992

1. Research Studies

- a. CB control agents other than KABAT,
1. Reviews of pertinent literature to identify candidate compounds (Ongoing).
 2. Locate and procure other IGR's (1st Qtr., 1992 and continuing).
 3. Compilation of a list of potential alternatives to methoprene for additional studies following management approval (1st Qtr., 1992 and continuing).
 4. Submit samples of potential new IGR's for pyrolysis and bioassay studies (1st Qtr., 1992 and continuing).
 5. Laboratory CB bioassays of commercially available candidate compounds using standard procedures (2nd Qtr., 1992 and continuing).
 6. Collect feral non-methoprene exposed CB (2nd-3rd Qtrs., 1992 and continuing during CB active periods in the warehouses).
 7. Culture all collected CBs on non-methoprene treated, ground, flue-cured tobacco (2nd-4th Qtrs., 1992 and continuing as insects become available).
 8. Conduct feeding studies, using Nylar,, on feral CB populations (1st Qtr., 1992).

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9. If NyLar, gives a dose-response curve different from KABAT,, conduct small scale field tests on tobacco (1992 - 1995).

b. CB physiological differences to methoprene and phosphine

(Methoprene)

1. Monitor tobacco processing and storage facilities for large infestations of CBs using pheromone traps (2nd - 3rd Qtrs., 1992 and continuing during insect active periods).
2. Upon finding any infestations, make collections and bring them to the lab. Establish laboratory cultures by raising the insects on methoprene-free flue-cured tobacco (3rd-4th Qtrs., 1992 and continuing as insects become available).
3. Subject the F_2 generations of the collected feral cultures to methoprene bioassays to determine the extent of methoprene resistance in local feral populations. It will take approximately 120 days to develop the F_2 generation prior to testing (3rd-4th Qtrs., and continuing).

(Phosphine)

1. Collection of live adult CBs (100/sample) from infested warehouses (1992 - 1996).
2. Submission of feral and lab-raised CBs to USDA for bioassay (1992 - 1996).
3. Evaluation of results and reporting of data with necessary cross-reference to USDA's data (1992 - 1996).

c. Methoprene esterase induction by CB

1. Collect eggs, larvae and adults from each CB culture in Project 1101, or that is collected from warehouses as received from outside sources (1st Qtr., 1992 and continuing).
2. Analyze all life forms (eggs, larvae, adults) from #1 for esterase activity using a dot-blot test (1st Qtr., 1992 and continuing).

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- d. Pesticide screening bioassay examining two different diets (tobacco vs. flue-cured (FC) tobacco).
1. Collect eggs from FC tobacco reared adults and place them on the following substrates: FC tobacco (control), flour, 1:1 FC tobacco-flour mixture; flour treated with 5 ppm methoprene (1st-2nd Qtrs., 1992).
 2. Collect eggs from the flour-reared adults and place them on the substrates listed in #1. Flour will serve as the control substrate (1st-2nd Qtrs., 1992).
 3. Monitor development of larvae on the various substrates (2nd-3rd Qtrs., 1992).
 4. Collect adults and allow them to oviposit on fresh substrates as listed in #1 (2nd-3rd Qtrs., 1992).
 5. Monitor development of larvae on various substrates (3rd-4th Qtrs., 1992).
 6. Identify which substrate has yielded the greatest number of adults in the F_2 generation (4th Qtr., 1992).
- e. Role of *Cryptococcus albidus* in CB physiology
1. Collect and culture symbionts from lab and feral CB strains on methoprene-treated media (1st Qtr., 1992).
 2. Determine whether esterase activity is induced in these symbionts (2nd Qtr., 1992).
 3. Using electrophoresis, determine the presence of additional enzymes produced by the symbionts in response to methoprene (3rd Qtr., 1992).
 4. Dose aposymbiotic CB eggs with various symbiont concentrations and determine the response of larvae reared on methoprene-treated tobacco (3rd-4th Qtrs., 1992).
- f. Pest Resistance

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1. Present prokaryotic organisms literature review to management and if a favorable response is received develop a plan to accomplish alternatives to the currently used pesticides (1st Qtr., 1992).
 2. In collaboration with Project 1902 personnel develop methodology to culture prokaryotic organisms active against the CB (1st-2nd Qtrs., 1992).
 3. Collaborate with FTR personnel on screening prokaryotic organisms for their ability to inhibit CBs (2nd-3rd Qtrs., 1992).
 4. Monitor literature for new subspecies (ongoing).
- g. Kabat application to Stems
1. Support Engineering Department personnel in evaluating the use of Kabat, to stems (1st-2nd Qtrs., 1992).
 2. Conduct field tests at stemmery (3rd-4th Qtrs., 1992).
2. Support Projects
- a. Infestation Control Manuals
 1. Review and update manual (1992-1996).
 - b. Customer complaint evaluation from Product Audit Facility.
 1. Continue to evaluate market customer complaints (1992-1996).
 - c. Assist PM USA and PMI
 1. Provide assistance as requested (1992-1996).
 - d. Phytosanitary Certification
(Export Strip Tobacco)

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1. Complete final test of tobacco probe conditioners at McKinney, Va. using a 3-step temperature cycle; issue report to ARS-USDA for approval (1st Qtr., 1992).
2. Conduct field tests of tobacco non-probe conditioners at 20th St. using a 3-step temperature cycle; issue report to ARS-USDA for approval (2nd Qtr., 1992).

(Export Cut Filler - conditioning)

1. Monitor CB populations at Westab for 6 months using pheromone traps (1st Qtr., 1992)
2. Establish sanitation procedures to meet "clean room" qualification (1st Qtr., 1992).
3. Submit report to ARS-USDA for approval (1st Qtr., 1992).

(Export Cut Filler - Modified Atmosphere)

Evaluation of a modified atmosphere chamber to disinfest export cut filler

1. Support Engineering Department personnel in evaluating of the use of a modified atmosphere to disinfest tobaccos destined for export so that the need for fumigation by methyl bromide for phytosanitary certification can be eliminated (1st-3rd Qtrs., 1992).

3. Resources

6.0 persons in Project 1101 (5.0 professionals; 1.0 technician). Additional resources: 0.25 persons from Analytical Research Division to conduct periodic methoprene residue analysis.

cc: R. Carchman
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Central File



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PLANS

1992-1996

1992 1993 1994 1995 1996

I. KABAT® strategies to achieve 100% on all tobaccos

Application to:

scrap/stems —→

oriental —→

- Application of: New formulations —→
- Alternatives to: e.g. Nylar —→
- Mechanisms of Resistance —→
- Competitor cigarettes —→
- Biological Activity —→

II. Improved Cultures —→

III. Support

- Consulting —→
- Customer Complaints —→
- Training Manual —→

IV. Planning

- Visiting Scientist —→
- Mini warehouse construction —→

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